

I CLAIM

1. In a chain hoist having a casing housing a bidirectional chain drive motor including a rotary drive shaft within said casing, the improvement comprising:

a position encoder including a position sensor also located within
5 said casing to produce encoded electrical position signals, and

a mechanical coupling also located within said casing and joined to transmit rotary motion from said rotary drive shaft directly to said position sensor.

2. A chain hoist according to Claim 1 wherein said mechanical coupling is comprised of a motor pulley mounted upon said chain motor rotary drive shaft, and an encoder pulley mounted in coplanar relationship with said motor pulley, a pulley drive belt engaged with both said motor pulley and said encoder pulley, and a position sensor shaft
5 oriented parallel to and laterally displaced from said chain motor rotary drive shaft, and both said encoder pulley and said position sensor are mounted coaxially upon said position sensor shaft.

3. A chain hoist according to Claim 2 wherein both said motor pulley and said encoder pulley are cogged pulleys and said drive belt is a cogged drive belt.

4. In a chain hoist having a casing with a bidirectional chain drive motor that has a rotary drive shaft housed therewithin, the improvement comprising:

a position encoder located within said casing including a position
5 sensor producing encoded electrical position signals in response to rotation of said drive shaft, and

tracking circuitry located within said casing for receiving electrically

encoded destination signals from a source located externally of said casing and for receiving said encoded position signals, and providing electrical encoded motor driving signals responsive to differences between said encoded position signals and said encoded destination signals, and wherein said motor driving signals accelerate rotation of said chain motor drive shaft starting from a stationary condition and decelerate rotation of said chain motor drive shaft as said differences between said encoded position signals and said encoded destination signals approach zero.

5. A chain hoist according to Claim 4 further characterized in that said electrical encoded motor driving signals of said tracking controller are digital signals and further comprising an isolation amplifier and converter circuit coupled to receive said digital electrical encoded motor driving signals and convert them to actuating signals, and an alternating current drive controller coupled to receive said actuating signals from said isolation amplifier and converter circuit so as to provide alternating current power outputs to said bidirectional chain drive motor in response to said actuating signals.

6. A chain hoist according to Claim 5 wherein said isolation amplifier and converter circuit includes optic couplers.

7. A chain hoist according to Claim 5 further comprising a motor brake for preventing rotation of said bidirectional chain drive motor, and operated by said alternating current drive controller which applies said motor brake when said differences between said encoded position signals and said encoded destination signals approach zero.

8. A chain hoist according to Claim 7 further comprising a brake relay for operating said motor brake coupled to receive brake actuating signals from said alternating

current drive controller.

5 9. A chain hoist according to Claim 4 further comprising an alternating current drive controller coupled to said tracking circuitry to receive said motor driving signals therefrom, and an encoder responsive circuit coupled to receive said encoded position signals and said encoded destination signals and connected to said alternating current drive controller and in parallel with said tracking circuit, whereby said alternating current drive controller responds to said tracking circuitry until and unless said differences between said encoded position signals and said destination signals falls to zero, whereupon said encoder responsive circuit overrides said tracking controller and operates said alternating current drive controller to stabilize and hold said chain drive motor at zero speed until and unless said tracking circuitry receives new destination signals.

10. A chain motor drive controller for a chain hoist having a casing with a bidirectional chain drive motor having a chain drive shaft located within said casing comprising:

5 a position encoder including a position sensor also located within said chain hoist casing,

a direct mechanical drive coupling from said chain drive shaft to said position sensor also located within said casing, and

10 a tracking controller also located within said casing and coupled to receive digitized electrical position outputs generated by said position sensor and to provide drive outputs that accelerate rotation of said chain drive shaft upon movement of said chain drive shaft from a stopped condition to a rotating condition and which decelerate rotation of

said chain drive shaft as said position outputs approach an externally determined destination position.

11. A chain motor drive controller according to Claim 10 further comprising an alternating current drive controller interposed between said chain drive motor and said tracking controller, and a digital-to-analog converter for transforming encoded motor driving signals from said tracking controller from a digital form to an analog form as motor command signals to which said alternating current drive controller responds.

12. A chain motor drive controller according to Claim 11 further comprising an optic isolation module interposed between said tracking controller and said alternating current drive controller, and said electrical encoded motor driving signals produced by said tracking controller are digital signals, and said optic isolation module transforms said digital motor driving signals to analog motor actuating command signals.

13. A chain motor drive controller according to Claim 11 further comprising a motor stabilization circuit receiving said position outputs from said position sensor and destination inputs from an external source, and said motor stabilization circuit is coupled directly to said alternating current drive controller and overrides said tracking controller only when said position outputs matches said destination inputs.

14. A chain motor drive controller according to Claim 13 wherein said direct mechanical drive coupling is a pulley and belt drive system.